The Gel of The Future: The Extraction and Creation of Polyethylene Degrading Bacterial Gel

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The purpose of this experiment is to determine the feasibility of creating a polyethylene-degrading bacterial gel. The larva of Galleria mellonella, also known as wax worms, was discovered recently to have the ability to consume plastic. This is useful to today's society because of the increasing issues regarding bio-magnification of plastic in the environment. In this experiment, polyethylene-degrading bacteria found in the digestive tract of wax worms were extracted and cultured on solid agar media. The bacteria were then sub cultured in Luria broth liquid, where polyethylene sheets were added. Results from this culture showed 47.96 percent, 51.23 percent, and 45.5 percent of the polyethylene sheet's mass was consumed by the bacteria after time periods of 24, 48 and 72 hours respectively. In addition to the liquid culture, the bacteria were transferred to a separate semi-solid gel culture to determine the feasibility and efficacy of a polyethylene-degrading bacterial gel. After applying the gel over polyethylene sheets over a time span of three days, results showed that 4.05 percent, 13.23 percent, and 11.11 percent of the polyethylene sheet's mass was consumed by the bacteria after time periods of 24, 48 and 72 hours respectively. The data collected from this research shows proof of concept of creating a polyethylene-degrading bacterial gel. The data can also be used to further advance the solutions towards reducing plastic contaminants in the environment.

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